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Mark Scheme (Results)

January 2022

Pearson BTEC Nationals
In Sport (31524H)
Unit 1: Anatomy and Physiology

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January 2022
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Unit 1: Anatomy and Physiology

General marking guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Mark grids should be applied positively. Learners must be rewarded for what they have shown they can do rather than be penalised for omissions.
- Examiners should mark according to the mark grid, not according to their perception of where the grade boundaries may lie.
- All marks on the mark grid should be used appropriately.
- All the marks on the mark grid are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks, if the learner's response is not rewardable according to the mark grid.
- Where judgement is required, a mark grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the mark grid to a learner's response, a senior examiner should be consulted.

Specific marking guidance

The mark grids have been designed to assess learners' work holistically.

Rows in the grids identify the assessment focus/outcome being targeted. When using a mark grid, the 'best fit' approach should be used.

- Examiners should first make a holistic judgement on which band most closely matches the learner's response and place it within that band. Learners will be placed in the band that best describes their answer.
- The mark awarded within the band will be decided based on the quality of the answer in response to the assessment focus/outcome and will be modified according to how securely all bullet points are displayed at that band.
- Marks will be awarded towards the top or bottom of that band depending on how they have evidenced each of the descriptor bullet points.

Question Number	Answer	Mark
1	Award **one** mark for identifying an example of a bone type. • A – Long (1) • B – Short (1) • C – Flat (1) • D – Sesamoid (1)	4

Question Number	Answer	Mark
2a	Award **one** mark for the correct movement. • Rotation (1)	1

Question Number	Answer	Mark
2b (i)	Award **one** mark for the movement. • Circumduction (1)	1

Question Number	Answer	Mark
2b (ii)	Award **one** mark for the movement. • Extension (1)	1

Question Number	Answer	Mark
3	Award up to **three** marks for identifying three functions of the skeleton. • Supports the body (1) • Protects the organs (1) • Provides a surface for muscle attachment (1) • Weight bearing (1) • Mineral storage (1) • Leverage/movement (1) • Reduced friction across a joint (1) • Blood cell production (1) Accept any other appropriate answer.	3

Question Number	Answer	Mark
4	Award up to **three** marks for explaining why the articular cartilage is important for a long jump to be performed. Articular cartilage absorbs the shock (1) due to the impact/load of the run up/take- off/landing (1) to prevent injury (1) Accept any other appropriate answer.	3

Question Number	Answer	Mark
5	Award **one** mark for identifying the role of each muscle. • A – Agonist (1) • B – Synergist (1) • C – Antagonist (1) • D – Fixator (1) Accept phonetic spelling.	4

Question Number	Answer	Mark
6a (i)	Award **one** mark for describing a concentric contraction and **one** mark for an appropriate example. • Muscle length decreases (under tension) (1) when performing a tuck jump (1) Accept any other appropriate answer.	2

Question Number	Answer	Mark
6a (ii)	Award **one** mark for describing an isometric contraction and **one** mark for an appropriate example. • Muscle length stays the same (under tension) /no movement (1) when performing a balance/handstand (1) Accept any other appropriate answer.	2

Question Number	Answer	Mark
6a (iii)	Award **one** mark for describing an eccentric contraction. • Muscle length increases under tension (1) DNA muscle relaxes Accept any other appropriate answer.	1

Question Number	Answer	Mark
6(b)	Award **one** mark for explaining why type IIx fibres are used primarily and **one** mark for a linked expansion. • Contract with a lot of force (1) topropel her higher/up (1) • Contract quickly (1) toget a good speed on the run up (1) Accept any other appropriate answer.	2

Question Number	Answer	Mark
6 (c)	Award **one** mark for explaining the impact of an increase in blood flow is and **up to two** marks for linked expansion. To provide more oxygen to the muscles (1) therefore more (aerobic) energy produced (1) enabling her to perform her routine and withstand fatigue/more carbon dioxide being removed from the muscle (1) Increase temperature of the muscles (1) therefore increasing pliability (1) enabling her to perform her routine with a greater range of movement (1) Accept any other appropriate answer.	3

Question Number	Answer	Mark
7	Award **one** mark for naming the lung volume • A – Residual volume/RV (1) • B – Vital capacity/VC (1) • C – Minute ventilation/minute volume/VE/Pulmonary ventilation (1) • D – Total lung capacity/TLC/Total lung volume (1) • E – Tidal volume/TV (1) Accept phonetic spelling.	5

Question Number	Answer	Mark
8	Award **one** mark for each respiratory adaptation and **one** mark for linked expansion, up to a maximum of **four** marks. • Increased vital capacity (1) which provides an increased supply of oxygen to the working muscles (1) • Increased strength of respiratory muscles (1) will make it easier to take deeper breaths/expand chest cavity more (1) • Increase in oxygen and carbon dioxide diffusion rates (1) be able to exerciseat a higher intensity for longer (1) Accept any other appropriate example.	4

Question number	Indicative content
9	Answers will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and level descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers. **Changes from rest to exercise** **(Inspiration)** • External intercostals and diaphragm contract with greater force • Volume of thoracic cavity increases more than at rest • Pressure decreases less than at rest • More air comes into the lungs/greater tidal volume **(Expiration)** • (Passive process at rest) active process at exercise • (Internal) intercostals/abdominals contract • Volume of thoracic cavity decreases more than at rest • Pressure increases more than at rest • More air forced out of the lungs **Impact on performance** • More oxygen can be delivered to the working muscles/more carbon dioxide removed. Accept any other appropriate answer.

Mark scheme (award up to 6 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.

Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–2	• Demonstrates isolated elements of knowledge and understanding.

		• Breaks the situation down into component parts and a few of the points made will be relevant to the context in the question. • Limited analysis which contains generic assertions rather than interrelationships or linkages.
Level 2	3–4	• Demonstrates some accurate knowledge and understanding. • Breaks the situation down into component parts and some of the points made will be relevant to the context in the question. • Displays a partially developed analysis which considers some interrelationships or linkages but not always sustained.
Level 3	5–6	• Demonstrates mostly accurate knowledge and understanding. • Breaks the situation down into component parts and most of the points made will be relevant to the context in the question. • Displays a developed and logical analysis which clearly considers interrelationships or linkages in a sustained manner.

Question Number	Answer	Mark
10	Award **one** mark for describing the role of the bicuspid valve. • Controls the flow of blood (1)from the **left** atrium/ or to the **left** ventricle (1) • Prevents backflow of blood (1) from the **left** ventricle/ or to the **left** atrium (1)	2

Question Number	Answer	Mark
11 (a)	Award **one** mark for identifying the structures within the cardiac cycle • A – Sinoatrial node/SAN (1) • B – Bundle of His (1) Accept phonetic spelling.	2

Question Number	Answer	Mark
11 (b)	Award up to **two** marks for describing the role of the AVN. The AVN/atrioventricular node receives an impulse (from the SAN/sinoatrial node) (1) holds/delays the impulse (for depolarisation) (1) transfers the impulse to the bundle of His/purkinje fibres/ventricles (1)	2

Question Number	Answer	Mark
12	Award up to **two** marks for identifying a function of plasma. • Transport nutrients/protein/water/salts(1) • Transport waste products (1) • Transport hormones (1) • Help in regulating body temperature (1) Accept any other appropriate answer.	2

Question Number	Answer	Mark
13a	Award up to **three** marks for describing how blood is clotted. Platelets (1) stimulate fibrin (1) form a plug/stick together (1) (white/red) blood cells attach to the clot/prevents further blood loss (from the wound) (1) Accept any other appropriate answer	3

Question Number	Answer	Mark
13 (b)	Answers will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and level descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers. • Blood is pumped out of the left ventricleinto the aorta • Blood then travels through arterioles to thecapillary network of the muscles • Oxygen rich blood is delivered to theworking muscle. • To continue to provide the energy formuscular contraction to throw punches. • Deoxygenated blood returns to the heartthrough venules, veins and finally the vena cava • From this, blood enters the right atriumand passes through the tricuspid valve • Deoxygenated blood then enters the rightventricle and is pumped to the pulmonary artery • The blood is then pumped to the lungs • The quicker this occurs, therefore, thishelps Heidi to continue/withstand fatigue until the later rounds of the match	6

Mark scheme (award up to 6 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.

Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–2	• Demonstrates isolated elements of knowledge and understanding. • Breaks the situation down into component parts and a few of the points made will be relevant to the context in the question. • Limited analysis which contains generic assertions rather than interrelationships or linkages.
Level 2	3–4	• Demonstrates some accurate knowledge and understanding. • Breaks the situation down into component parts and some of the points made will be relevant to the context in the question.

		• Displays a partially developed analysis which considers some interrelationships or linkages but not always sustained.
Level 3	5–6	• Demonstrates mostly accurate knowledge and understanding. • Breaks the situation down into component parts and most of the points made will be relevant to the context in the question. • Displays a developed and logical analysis which clearly considers interrelationships or linkages in a sustained manner.

Question Number	Answer	Mark
14	Award **one** mark for each recovery time, up to a maximum of **three** marks. • A – 10 seconds - 4 minutes • B – 3 minutes – 2 hours • C – 2 hours – 48 hours Accept any other appropriate answer.	3

Question Number	Answer	Mark
15	Award **one** mark for each descriptive point, up to a maximum of **four** marks. • Phosphocreatine/PC/CP is broken down/split (1) • By creatine kinase (1) • To release energy/coupled reaction (1) • Provides a phosphate to join with ADP (1) • To create **1 ATP** (1) Accept any other appropriate answer.	4

Question Number	Answer	Mark
16	Answers will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and level descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers. • All three systems work together to provide the energy. **ATP-PC system** • System used for activity lasting 8–10 seconds • High intensity activities • Phosphocreatine stores are replenished quickly, so supported during breaks in the game • Sprinting around the pitch to maketackles/runs down the wing/ used when shooting/jumping for a header **Lactate system** • Provides energy for moderate to high intensity activity • Only lasts for 1–3 minutes • Will be used during long, intense phases of play that last longer than 10 seconds, suchas a counter attack **Aerobic system** • Low to moderate intensity • Lasts longer than 1 minute • Works when intensity falls in the match (ball goes out of play) and helps the other energy systems/muscles recover • To supply the energy when the matchis going into the last minutes of the game	6

Mark scheme (award up to 6 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.

Level	Mark	Descriptor
Level 1	1–2	• Demonstrates isolated elements of knowledge and understanding.

		• Provides little or no reference to the context in the question. • A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. • Response is likely to lack clarity, organisation and the required technical language.
Level 2	3–4	• Demonstrates accurate knowledge and understanding. • Line(s) of argument occasionally supported through the application of relevant references to context in question. • Judgement is made from a partially-developed discussion, although the discussion may be imbalanced or superficial in places. Learners will produce some statements with development in the form of mostly accurate and relevant factual material leading to an assessment being presented. • The response may contain parts which lack clarity or organisation. There is evidence of correct technical language being used.
Level 3	5-6	• Demonstrates accurate knowledge and understanding. • Line(s) of argument supported throughout by sustained application of relevant references to context in the question. Might demonstrate the ability to integrate and synthesise relevant systems. • Arrives at a supported judgement from a well-developed and logical balanced discussion, containing logical chains of reasoning. Demonstrates an awareness of competing arguments using these to reach a valid assessment. • Response demonstrates good organisation, clarity and use of technical language.

Question Number	Answer	Mark
17	Answers will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and level descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers. **Cardiovascular system** • Sunita's cardiovascular system will have adapted through cardiac hypertrophy • This increases stroke volume and reduces the need for the heart to beat so many times thus slowing the cardiac cycle • This will give Sunita a giving her greater heart rate range to utilise when playing rugby • Giving her a greater maximal cardiac output • Sunita will also have an increased blood volume • Meaning more oxygen is transported to her muscles • Decreased heart rate recovery time, so that she can continue playing • Capilliarisation around the skeletal muscle and alveoli and in the muscles will increase the efficiency of gaseous exchange **Energy system** • Sunita will have increased creatine store providing her with more energy and supporting recovery from high intensity runs around the pitch • She will have increased tolerance to lactate, which will enable her to keep moving around the pitch and delaying fatigue • Increased use of fats as an energy source, so that glycogen can be used later in the game and Sunita will last the duration • Increased storage of glycogen to provide energy for ATP production • Increased number of mitochondria will increase the amount of ATP production to support an increased demand for energy • More efficient energy systems **Application to performance** • e.g. Maintain ability to continue to make tackles • e.g. Recover from a run down the wing quicker • e.g. Make more repeated sprints to chase the ball • Accept any relevant rugby applied points, e.g. last the full game delaying fatigue/delays OBLA, be able to work at a high intensity throughout, maintain quality of performance	8

Mark scheme (award up to 8 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.		
Level	**Mark**	**Descriptor**
Level 0	0	No rewardable material.
Level 1	1–3	• Demonstrates isolated elements of knowledge and understanding. • Breaks the situation down into component parts and a few of the points made will be relevant to the context in the question. • Limited analysis which contains generic assertions rather than interrelationships or linkages.
Level 2	4-6	• Demonstrates some accurate knowledge and understanding. • Breaks the situation down into component parts and some of the points made will be relevant to the context in the question. • Displays a partially developed analysis which considers some interrelationships or linkages but not always sustained.
Level 3	7-8	• Demonstrates mostly accurate knowledge and understanding. • Breaks the situation down into component parts and most of the points made will be relevant to the context in the question. • Displays a developed and logical analysis which clearly considers interrelationships or linkages in a sustained manner.

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